

Latest experimental results using large area picosecond photodetectors

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For the planned future upgrades of several high energy physics experiments, highly performing position sensitive photodetectors are needed. In ring imaging Cherenkov counters, planned for the upgrades of LHCb and Belle II experiments, detection of single photons with position resolutions as good as 1 mm will be required, with timing resolution on the order of 100 ps and surface coverage of m^2 . In addition, the photodetector has to operate in high magnetic field and neutron radiation background, and no current photodetector can fulfill all of the requirements. One promising development is the large area picosecond photodetector (LAPPD), which features a large area of 200 mm x 200 mm and achieves excellent performance by using microchannel plates (MCP). In this contribution, experimental results obtained with the generation I LAPPD produced by INCOM company are presented. Using custom designed PCBs, capacitive couplings to the anode with different segmentation, and therefore, spatial resolution capabilities, were explored. As the photodetector readout, PETsys TOFPET 2, as well as FastIC ASICs were used. Reported results include characterization of spatial response, using precision scanning of focused laser light, and temporal response to picosecond illumination at single photon level.

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